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To reduce energy losses in winter (and gains in summer) through windows in Navy housing, NFESC has examined energy efficient windows for their cost effectiveness, identified framing and glazing options, developed simple equations and procedures to determine the best option for each application, and prepared a User Data Package (UDP) for use by field personnel.

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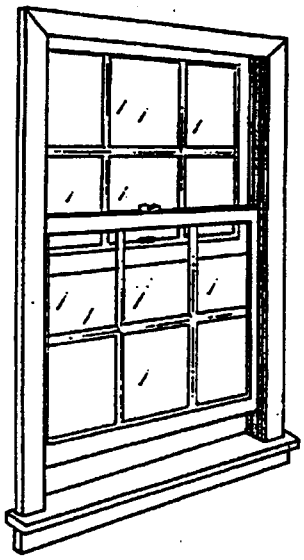

Energy Efficient Windows for Navy Housing

Double-glazed, low-E coated windows can reduce heat losses by 60% or more compared to single-glazed windows.

To reduce energy losses in winter (and gains in summer) through windows in Navy housing, NFESC (formerly NCEL) has examined energy efficient windows for their cost effectiveness, identified framing and glazing options, developed simple equations and procedures to determine the best option for each application, and prepared a User Data Package (UDP) for use by field personnel. This UDP was distributed throughout the Navy as NCEL Contract Report, CR 90.011 in 1990*. A summary of the UDP was also distributed to the Navy in Sept 1990 via Techdata Sheet TDS 90-06. This TDS supplements TDS 90-06.

Although information given in both the UDP and the TDS distributed in 1990 is still applicable, additional information is now available that simplifies the procedure given in the UDP for identifying energy efficient windows. Revised procedures are expected to be ready by FY96.

Sources of heat gains or losses through windows are:

- A combination of conduction, convection, and radiation heat transfer through the window glass, frame, and other components.
- Air infiltration through the windows.
- Direct solar radiation through the window.

These sources of heat transfer were considered in the UDP for calculating energy gains and losses through windows. Since its publication, representatives from the window industry, state energy departments, electric utilities, and testing and research organizations joined together and formed the National Fenestration Rating Council (NFRC) to bring uniformity and coherence to the energy efficiency claims for windows. NFRC:

a. Publishes a ***Certified Product Directory*** that includes certified energy ratings for fenestration products (windows, doors, skylights, etc.). The Directory will soon include solar heat gain and air leakage ratings.

*Naval Civil Engineering Laboratory. CR-90.011: ***User Data Package: Energy-Efficient Windows and Window Coverings for Naval Housing***, July 1990.

b. Has recently finalized procedures to rate fenestration solar heat gain that will simplify shading coefficient comparisons and further help with estimating the energy saving potential of windows.

c. Is finalizing fenestration air leakage rating procedures and will provide comparable air leakage ratings in the Directory.

d. Is developing rating procedures for long-term energy performance, annual energy performance, condensation resistance, and other energy related parameters.

Based on our review, items (b) through (d) are still under development. Consequently, modification of Navy guide specifications used to purchase the most energy efficient, cost effective windows must await development at NFRC. However, the following general conclusions can be disseminated at this time:

- NFRC certified U-values should be used for calculating heat gains and losses through windows using procedures given in the UDP. Any window that does not have an NFRC rated U-value should not be considered by the Navy.

- The Navy should state in its procurement specifications that the windows offered to the Navy must have an infiltration rate below 0.37 cfm/ft as certified by NFRC (once NFRC begins to publish this information). Calculating energy gains and losses through a window due to air infiltration will then become unnecessary.

- When available, NFRC certified values of solar heat gain coefficients should be used for calculating solar heat gains. Until then, vendor provided values should be used.

- Thermal performance of existing windows to be replaced should not be compared with replacement windows; compare only replacement alternatives with each other to identify the most energy conserving cost effective window.

After the energy saving potential of windows for your climate has been determined, then the payback period for each window alternative should be calculated. Based on your requirement, you can either choose a window that has the lowest payback period, or a window that saves the most energy. In either case, a window with an overall U-value of around 0.35 Btu/hr-ft^2-°F or less is expected to be the window of choice for most housing applications where the current heating and/or cooling load is considered to be a place for energy conservation. Typically, these will include windows with a low conductivity frame, double glazing, and one or more low-E coatings.

NFESC has a limited number of the Directory available for distribution to any Naval facility energy manager or specifier at no cost (on a first come first served basis). Send your request by FAX or mail to the address given in the box below. Others may order the Directory by mailing a check for $10.00 to:

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1300 Spring Street, Suite 120
Silver Springs, MD 20910
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